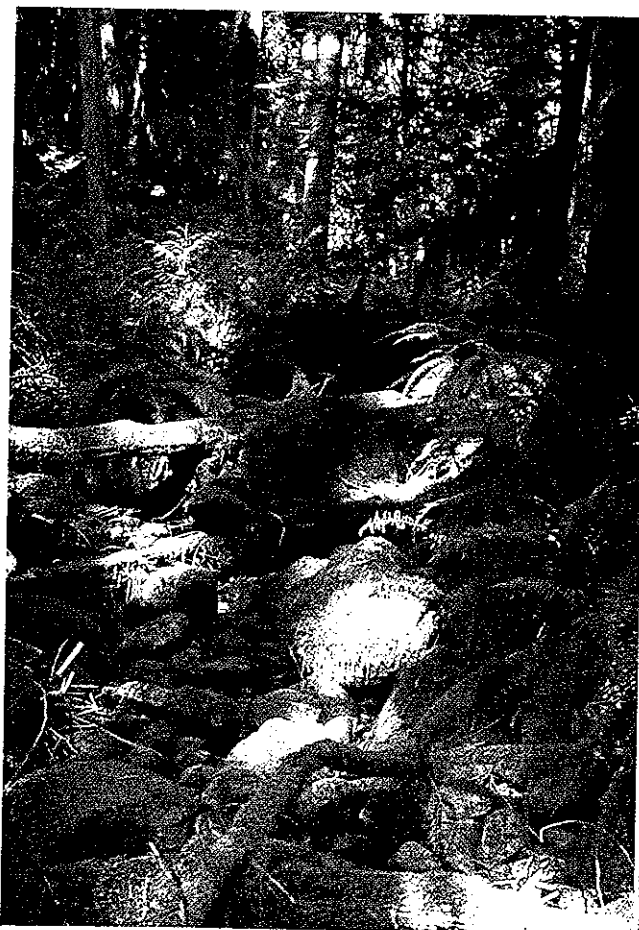


MOIST CONIFEROUS FOREST

Deanna H. Olson

Although the Pacific Northwest is often stereotyped as having an abundance of moist coniferous forests, this habitat has a restricted distribution within the region. Classic wet, temperate coniferous forests dominate uplands along the west coast of the Northwest from Alaska down to California, in the Gulf of Alaska Mountains and Fjordlands, S.E. Alaska – B.C. Coastal Forest and Mountains, North Cascades, Pacific Northwest Coast, West Cascade, and California North Coast ecoregions. In inland areas, windward slopes of mountain ranges, such as the West Cascades and Canadian Rocky Mountains ecoregions also have moist coniferous forest types. Climate and vegetation in these forests vary in relation to elevation, aspect, latitude, and coastal versus interior location. As such, the term 'moist' (e.g., amount of precipitation received and retained) is relative to where you are within the Northwest. Moist coniferous forests are composed primarily of Douglas-fir, Sitka spruce, western red cedar, western hemlock. Moist coniferous forests in the Intermountain West contains a mixture of tree species that are commonly found in dry sites as well. Depending on stand age, unmanaged moist coniferous forests usually have fairly dense stands of large trees, an understory that included moss, ferns, and rich organic soils.

The herpetofauna most closely associated with moist coniferous forests include: 1) terrestrial lungless salamanders, 2) stream-breeding amphibians, and 3) pond-breeding amphibians. Terrestrial salamanders are typically found in moist refuges, such as downed wood or coarse substrates. Stream-breeding amphibians occupy cool mountain tributaries and the adjacent riparian and upslope forest areas. Pond-breeding amphibians

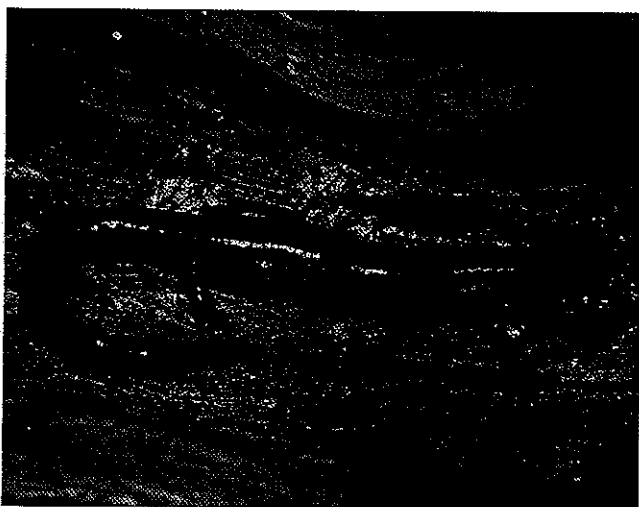


Elke Wind

Many Northwest amphibian species are associated with older forests, large downed wood, and small stream habitats that provide appropriate temperature, moisture, and cover. Timber-harvesting techniques, such as group selection and individual selection, and continuing efforts to leave stumps and downed wood, reduce soil compaction, and buffer streams help maintain these habitat elements and conditions for amphibians.

breed in standing water and then disperse into forested uplands for foraging and refuge. Many of these amphibians are endemic to the region and have specific habitat needs. Consequently, no matter where you are in the moist coniferous forest landscape, about half of the amphibians at that location are of conservation concern to state or federal resource agencies. Small streams, springs, and seeps are often embedded in these forest habitats and increase the diversity of amphibians found in the forest. Several reptile species occur in moist forests, although most use other habitat types as well.

The loss of tree canopy cover and ground disturbances from development and timber harvest activities are major challenges to herpetofauna conservation in Northwest moist coniferous forests. Loss of canopy cover changes the microclimate conditions required for many amphibian species, particularly in southern latitudes and on south-facing slopes. Ground disturbance affects both surface and subsurface microhabitats and can be harmful to species that are associated with duff, litter, and downed wood. Stream-dwelling amphibians in these forests are affected by increased siltation and water temperatures that may occur after timber harvest, as well as alteration of bank and streambed morphology



Bill Leonard

A large number of lungless, terrestrial-breeding salamanders are only found in moist coniferous forests in the Northwest. Maintenance of a cool, moist forest floor enhances their survival in these habitats.

CHARACTERISTIC SPECIES

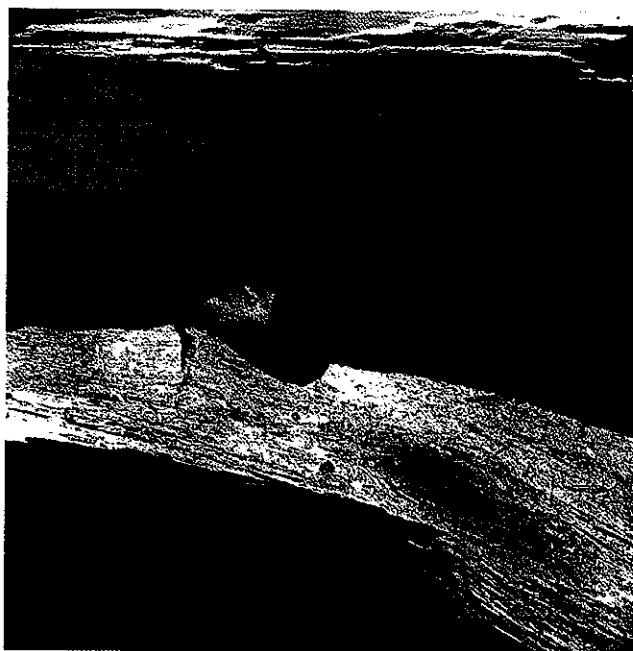
Salamanders: Northwestern Salamander, Rough-skinned Newt, all species of Climbing, Slender, Ensatina, and Woodland Salamanders
Frogs and Toads: Red-legged Frog, Foothill Yellow-legged Frog, Cascades Frog, Columbia Spotted Frog
Snakes: Rubber Boe, Sharp-tailed Snake, Aquatic Gartersnake

MAXIMIZING COMPATIBILITY:

Timberlands, Farmlands, Recreational Lands, and Other Integrated Land Uses

Consider the following options if benefiting amphibians and reptiles is secondary to other management objectives.

- **Whenever possible, conduct forest management activities and ground disturbances in dry summer or cold winter months.** Forest amphibians are less active at the surface during these times. However, reptiles may still be active during dry summer months.
- **Manage for a variety of stand ages and types to provide a variety of habitat conditions at the stand and landscape level.** Consider establishing some no-entry patches within harvesting areas and using forest density management (e.g., thinning to achieve variable canopy closure).
- **Consider the effects of site location, precipitation patterns, and topography on the retention of cool, moist microhabitats for forest-associated amphibians.** For example, species may be more resilient to the loss of forest canopy cover on north-facing slopes in maritime climates near the coast compared to inland, south-facing slopes. However, these north-facing coastal areas may be species hotspots or source areas for recolonization.
- **Retain downed wood.** Amphibians and reptiles use downed wood as cover and sources of moist microhabitats during the dry season.



Elke Wind

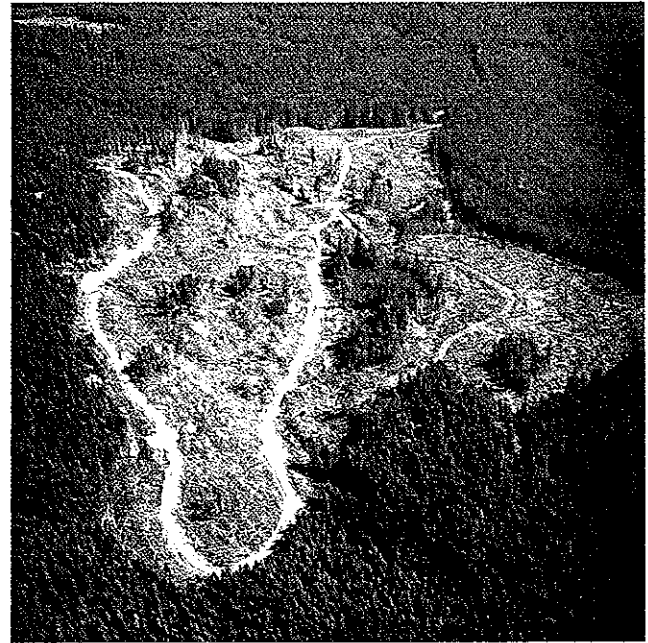
Many terrestrial salamander species lay their eggs in downed logs, and both amphibians and reptiles use downed wood for cover.

IDEAL: Refuges, Sanctuaries, and Preserves

Consider the following options if benefiting amphibians and reptiles is a primary objective and when landowners and managers wish to restore, enhance, or maintain natural habitat conditions for native herpetofauna.

- **Maintain or restore the specific habitat conditions with which resident species are associated.** *Due to the complex life histories of many forest-dwelling amphibians, they may rely on several microhabitat conditions within the terrestrial forest landscape such as large downed wood, talus, and cool microclimates provided by shading.*
- **Attempt to replant (preferably with native species) and reduce erosion in disturbed areas, especially around skidding and landing zones.** *Deactivate or restore temporary roads that are constructed for timber harvesting to prevent further use. Moving stumps and logs into these heavy use areas can provide cover and moisture for amphibians and reduce further use of these areas as roads.*
- **Retain large trees and conserve snags for future recruitment of downed wood used by amphibians and reptiles for cover and breeding.**
- **Maintain natural wetland habitats and nearby uplands through the use of buffers.** *Buffers at least 50-330 feet (15-100 m) wide will provide cooler, moister conditions near streams and wetlands and increase long-term recruitment of litter and wood to the forest floor.*

This is the 'Moist Coniferous Forest' module of the PARC Publication HMC-4. ISBN: 0-9667402-5-4. Please visit www.parcplace.org for further information, copies of the complete document, or a web-based version of the Guidelines.



Elke Wind



Elke Wind

Northwest amphibians associated with moist coniferous forests benefit from timber harvesting practices that retain cover and moist microsites.



Elke Wind



HABITAT MANAGEMENT GUIDELINES FOR AMPHIBIANS AND REPTILES OF THE NORTHWESTERN UNITED STATES AND WESTERN CANADA

TECHNICAL PUBLICATION HMG-4

PURPOSE AND INTENDED USE OF THIS DOCUMENT

The goal of this book is to provide amphibian and reptile habitat management guidelines that are easily understood and practical for resource managers and private landowners to integrate with other management objectives on the landscape.

Many amphibian and reptile populations are vulnerable to the effects of habitat loss and degradation in the United States and Canada. A significant challenge is to ensure the persistence of amphibians and reptiles through thoughtful management of private and public lands and the resources they contain. When applied on the ground as general management principles, the guidelines provided in this document will promote conservation of amphibians and reptiles by

- Keeping common species common
- Stemming the decline of imperiled species
- Maintaining existing habitats
- Guiding restoration of degraded habitats

Landowners and resource managers will benefit from these guidelines because their implementation will provide ecological benefits beyond amphibian and reptile conservation. Even if only some of these guidelines are implemented, the cumulative effect will be positive.

The general information and specific management guidelines presented here (hereafter Guidelines) are based on the best available science, peer-reviewed expert opinion, and published literature. The "Maximizing Compatibility" and "Ideal" management guidelines are recommendations made and reviewed by groups of professionally trained herpetologists and wildlife biologists from private, state/provincial, and federal organizations. Because of the taxonomic and ecological diversity of amphibians and reptiles, some recommendations may not apply to every species in every situation. The authors and editors of the Guidelines suggest consult-

ing a local herpetologist before making significant land-use changes when implementing the suggested guidelines. The Guidelines, which are developed by Partners in Amphibian and Reptile Conservation (PARC), are not legally binding or regulatory, and they do not in any way attempt to limit landowner rights. They can be regarded simply as recommendations from the PARC community to landowners and managers who are considering the needs of amphibians and reptiles in the course of their land and resource management activities. References to specific sources of information used in each of the regional Guidelines can be found at www.parcplace.org.

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